



## NEW HAMPSHIRE NATURAL HERITAGE BUREAU

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**To:** Site Evaluation Committee

**From:** Melissa Coppola, Environmental Information Specialist

**Date:** November 12, 2008

**Subject:** Progress Report: Site Evaluation Committee No. 2008-004  
Application of Granite Reliable Power, LLC

This progress report provides details about the Natural Heritage Bureau (NHB) site visit to a portion of the proposed wind facility as well as comments on the ecology of the site and the importance of mitigation for high-elevation forest impacts. NHB staff only visited the Mt. Kelsey – Owlhead area, but the comments and considerations below would apply to high-elevation forests throughout the project area. Mitigation of the high elevation impacts is especially important for this region because intact examples of these natural community types are becoming less common. This decline in intact high-elevation habitat was recently documented in a report by the Society for the Protection of New Hampshire Forests that found considerable timber harvests have been occurring above 2,700 ft. in Coos County (Sundquist and Birnie 2008).

### Site Visit

On October 6, 2008 Natural Heritage Bureau staff visited the locations of proposed turbines and new roads on Mt. Kelsey and Owlhead with staff from Stantec Consulting. NHB had requested this site visit in part to clarify the location of and possible impacts to a circumneutral hardwood forest seep that was identified in the Reconnaissance-Level Rare Plant Survey (2007) and Rare Plant Survey (2008) in the saddle between Mt. Kelsey and Owlhead. The other goal of the site walk was to visit the high-elevation spruce-fir and high-elevation balsam fir forests on Mt. Kelsey and examine the communities' exemplary status. Mt. Kelsey had been described in the Stantec reports as having little or no previous management impacts, increasing the likelihood that natural communities in the area would be considered exemplary and thus be a priority for conservation.

On the visit, the only evidence of a previously reported circumneutral seep was found in an area that had been recently clearcut. No circumneutral hardwood forest seep was found in the upper saddle between the two mountains where the new road is proposed. However, several acidic sphagnum forest seeps were found the saddles between the various peaks of Mt. Kelsey.

Three factors are used to determine whether a natural community is exemplary: size, condition, and landscape context. Even small (e.g., 10-acre) forests can be exemplary if the forest is in excellent condition (largely undisturbed) and surrounded by other high quality natural communities. The current condition of high-elevation spruce-fir and balsam fir forests of Mt. Kelsey as observed on October 6 is complicated. Much of the forest, as previously described, is an intact forest community with no evidence of past management history. Mature trees and a well-developed carpet of bryophytes (mosses and liverworts) cover much of Mt. Kelsey (photos 1-2). However, both the southern and northern-most summits of Mt. Kelsey, areas previously identified as important Bicknell's thrush habitat, had been recently cleared (photos 3-6).

Most of the surrounding landscape is industrial forest that has also been recently clearcut (photo 7). This alone would not exclude the community from exemplary status, since the landscape is still natural versus developed landscape, but it lowers the overall quality of the community, as it will take many years for the surrounding forests to return to pre-harvest conditions.

Prior to the recent timber harvests the high-elevation forests may have been considered exemplary, but the combination of cuts on the summit and in the surrounding landscape drops the area below exemplary status. The areas that were not cut are still high quality, with little evidence of past human-influenced disturbance. Since the cut areas will recover without additional impacts, the overall area is still a locally significant high-elevation forest. It is therefore critical that there be effective mitigation to off-set the impacts that the proposed project will have on these sensitive forest communities.

### **Ecological Considerations and Mitigation Comments**

High-elevation forest lands possess unique ecological characteristics. Factors shaping these areas include: harsh climate, rugged terrain, and increased precipitation. The impact of these factors on soil development at high elevations is one of the critical differences between these forest communities and forests of lower elevations. Chemical reactions are slower at higher elevations (lower temperatures), which reduces the weathering of rock and slows down the release of mineral nutrients. Also, colder soil temperatures reduce microbial activity, which greatly slows decomposition and nutrient turnover. The result is that these forests have very little well-developed or stable soil. There is often little mineral material and the soils are essentially organics mats over gravel, boulders, or bedrock (Reiners and Lang 1979).

The thin, unstable soils of high-elevation forests increase the sensitivity of this type of forest community to disturbance. Blow-downs are frequent, as most trees are shallowly rooted in these soil types (Foster and Reiners 1983). Even comparatively small soil erosion events can be detrimental to existing trees, and can limit the potential for recolonization after disturbance.

The soils of the high-elevation forests of Mt. Kelsey are mapped as the Saddleback-Glebe-Ricker association. Based on the taxonomic class of each of the soil series represented in this association, the soil conditions described above apply to the high-

elevation forest communities at this site. The NRCS soil description for this association lists concerns associated with forestry and recreation including: shallow rooting depth on Saddleback and Ricker soils, limitations for use of logging equipment and erosion hazard on all three soil types, and severe windthrow hazard on Saddleback and Ricker soil. The thick organic surface of the Ricker soils, the erodibility of the Glebe soils, and the fragile nature of both are listed as severe concerns for hiking paths and trail development (USDA 2006).

Based on what is known about the fragile nature of the soils within high-elevation communities, it can be inferred that the proposed project will have impacts that exceed the project footprint itself, even if BMPs are used. The combination of soil characteristics and steep slopes increases the potential for significant impacts. Blow-downs along the exposed edges are very likely and erosion will be an ongoing problem. Studies on the association of roads and erosion in other montane environments have shown that the lateral extent of environmental impact of roads in steep terrain is much greater than commonly perceived (Larsen and Parks 1997).

Due to the fact that the project impacts will extend well beyond the project footprint, the proposed mitigation of placing a 500 ft. conservation easement around the limits of all facilities on Owlhead and Mt. Kelsey, and a 200 ft. buffer around the access road leading up to the site, should not be considered adequate mitigation. A successful mitigation area should not be impacted by the project itself. The proposed mitigation area would be impacted by wind throw and soil erosion created by the project. The linear nature of the proposed mitigation, coupled with the recent clearcuts, would create a narrow band of intact forest sandwiched between wind turbines and road (permanent disturbance) and clearcut (temporary but long lasting disturbance). This mitigation proposal would protect little to no habitat from edge effects and fragmentation. Edge effects would be even more dramatic in high-elevation forests due to soil instability, lack of nutrients, slow growth and harsh climate.

The project area should be protected from intensive future management via an MOA with the Division of Forests and Lands and NH Fish and Game. However, this does not adequately suffice as mitigation since the impacts of the projects itself would extend into the mitigation area, which would defeat the effectiveness and purpose of mitigating impacts. Mitigation for the impacts to high-elevation spruce-fir forests should seek to protect an intact high-elevation forest of equal or better ecological value than the one that will be impacted.

## Questions

Table E in the Application of Granite Reliable Power, LLC for Certificate of Site and Facility indicates that less than 2% of the high elevation (above 2700') natural communities would be impacted by the project. Did estimates of impact size include windthrow and other effects extending beyond the actual construction areas?

Table E lumps all of the natural communities that occur at 2700' and above. The greatest impact will occur in the high-elevation spruce-fir and balsam fir forests, which are only a subset of those found above 2700'. Please recalculate this table broken down into community type. Include already-clearcut areas as a separate community type.

Both the Application of Granite Reliable Power, LLC for Certificate of Site and Facility and the Alteration of Terrain Permit Applications indicate that BMPs and SWPPP will be utilized during tree clearing as stated in the Alteration of Terrain Permit. Please distribute copies of the BMP that will be used. Are they specific to high-elevation forests? Will any additional steps be taken specific to high elevations?

Have smaller higher elevation wetlands, e.g. forest seeps, especially in the saddles between the summits of Mt. Kelsey, been included in the wetland impacts?

## Literature Cited

- Foster, JR and Reiners, WA. 1983. Vegetation patterns in a virgin subalpine forest at Crawford Notch, White Mountains, New Hampshire. *Bulletin of the Torrey Botanical Club* 110(2) 141-153.
- Larsen, MC and Parks, JE. 1997. How wide is a road? The association of roads and mass-wasting in a forested montane environment. *Earth Surface Processes and Landforms* 22(9) 835-848.
- Reiners, WA and Lang, GE. 1979. Vegetational patterns and processes in the balsam fir zone, White Mountains, New Hampshire. *Ecology* 60(2) 403-417.
- Sundquist, D and Birnie, R. 2008. North Country Timber Harvest Trends Study. A Report by the Society for the Protection of New Hampshire Forests Research Department. Concord, NH.
- USDA-Natural Resources Conservation Service. 2006. Soil Survey Data Coos County Area, New Hampshire-Interim Release 1.0.





Photos 1 and 2. Intact high-elevation spruce-fir forest on Mt. Kelsey (10/6/2008).







Photos 3-4. South summit of Mt. Kelsey as seen on October 6, 2008. Note blow-downs along edge of cut area.







Photos 5-6. North summit of Mt. Kelsey as seen on October 6, 2008. Note blow-downs along edge of cut area.







Photo 7. View of Mt. Kelsey from the south on October 6, 2008, showing the surrounding landscape context.